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ELMER DREW MERRILL 1876-1956

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*With portrait **

PROFESSOR ELMER DREW MERRILL, Arnold Professor of Botany, *emeritus*, and former director of the Arnold Arboretum, died on ~~FEBRUARY~~ 25, 1956, in the Lemuel Shattuck Hospital, Forest Hills, Massachusetts. Few American botanists were as well known or as widely honored as Dr. Merrill. Few, also, have published as much as he in his long and distinguished career as botanical administrator and research taxonomist. In a knowledge of the flora of Asia no one has equalled him and it is improbable that any future botanist can match his publications on the flora of that area.

Physically a man of slight build, Dr. Merrill's health was excellent and he often stated he never knew sickness until a short while after his retirement when he suffered the first of many strokes which were to cause his death. In early September of 1955 a severe attack ended his active career and caused him to be bedridden and paralyzed until his death five months later.

Many complete biographical sketches of Dr. Merrill have been published and in 1953 he published in the *Asa Gray Bulletin* the first part of his autobiographical memoirs with the promise of completion in later issues. *Who's Who in America*, *American Men of Science* and "Merrilleana," a volume of selections from his general writings which was published in his honor as a double number of *Chronica Botanica*, detail his career and his publications.

Elmer Merrill was born in East Auburn, Maine, in 1876. He entered the University of Maine in 1894 and an interest in biology supplemented by summer employment in the State Fish Hatchery replaced an earlier interest in engineering. He reports that his first collections of plant materials were inspired by Professor F. L. Harvey and that during his college career he amassed a collection of more than 2000 named specimens of all groups of plants which later were presented to the New England Botanical Club. Duplicates of these specimens were sent to the New York Botanical

* This portrait was taken in 1950 by Dr. Louis O. Williams in Honduras.

Garden in exchange for a copy of Britton and Brown's *Illustrated Flora of the Northern United States* and through these specimens an early contact with N. L. Britton was established. Following his graduation Merrill returned to the University of Maine as an assistant in natural sciences where, although no formal postgraduate work was offered, he "rounded out his college work," "gained additional experience" and followed his own "inclinations in the pursuit of systematic botany, although having little or no supervision." For these efforts Dr. Merrill was awarded an M.S. degree by the university in 1904, although he states "I can hardly claim that it was an earned degree." In later life Dr. Merrill was similarly rewarded for his accomplishments when he received honorary degrees of Doctor of Science (University of Maine, 1926, and Harvard University, 1936) and Doctor of Letters (University of California, 1936, and Yale University, 1951).

From 1899 until 1902 Merrill worked for the U. S. Department of Agriculture as assistant agrostologist, serving part of this time as assistant to F. Lamson-Scribner. Apparently none too satisfied with his chosen employment, he entered the Medical School of George Washington University, but during the first semester of his second year was offered a position as botanist with the Insular Bureau of Agriculture in the Philippines. His spartan boyhood stood him in good stead for the active career which followed, for his acceptance of this position and his arrival in Manila in 1902 marked the start of over fifty years of devoted study of Oriental flora. In the Philippines Merrill observed that the Bureau of Forestry was in greater need of the services of a botanist than was the Bureau of Agriculture and within a few months of his arrival in Manila he obtained a joint appointment to both bureaus. Thereafter he devoted his time to a study of the plant materials of the archipelago, spending approximately half of his time in the field collecting. Few government officials of his period and certainly only a few botanists since that time have visited as many parts of the islands as did Dr. Merrill. Identification of the specimens collected proved impossible with the library resources at hand and so over a period of years a remarkable library was built up under his guidance. To Merrill also must go the credit for starting the herbarium collections in 1902 which, by 1922, two years before the end of his Philippine service, numbered 275,000 mounted specimens. Merrill lived to see both this magnificent herbarium and library destroyed by the Japanese during World War II and lent his unfailing assistance in securing duplicate books and specimens to rebuild this collection.

Merrill states that on reaching Manila his ambition was the preparation and publication of a general flora of the Philippines. However, the number of plants known from the Philippines as recorded in published literature was 2500 in 1900 when Merrill started collecting and over 14,000 in 1923 when the team with which he worked, Copeland, Whiteford, Elmer and others, had completed their intensive collecting. Identifications were made first by trips to the garden and the botanical institution at Buitenzorg and later, during his periodic leaves, in the principal herbaria of Europe. In

view of the difficulties of identification and of handling such a complex flora, it is not surprising that Merrill's original ambition of a general flora was never accomplished. He laid the groundwork for such a flora, however, and through his efforts we have today a "Flora of Manila," published in 1914 and "An Enumeration of Philippine Flowering Plants," published in sections between 1923 and 1926, the latter with a total of 2143 pages. Professor Merrill's personal copy of his Enumerations (now in the library of the New York Botanical Garden) was carefully annotated with new records, changes in nomenclature and additional bibliography. As he worked with the flora of the Philippines and was exposed to flora of other island and mainland areas in Asia, Dr. Merrill recognized that a larger approach was needed for a proper interpretation and definition of the many species in the Philippines. Thus his interests, while still in the Philippines, spread to the phytogeography of the area, as well as the flora of China, Borneo and Guam as indicated in his published papers.

As his seniority in the Philippines increased and his abilities were recognized, Dr. Merrill was called upon for other duties. His knowledge was needed at the young University of the Philippines where he had an appointment as associate professor and later, head of the Department of Botany, in spite of a teaching load of eighteen to thirty-six hours a week. At the Bureau of Science during the absence of the director he served as acting director and in 1919 he became the director, serving in this capacity until 1923. In his autobiography Dr. Merrill describes fully his frustration at the heavy administrative load, which was unsought, and also noted his resentment of the tasks which conflicted with his real desires for taxonomic botanical work. His efforts as director of the Bureau of Science, supervising the research activities in fields other than botany, enhanced his background in agriculture administration and prepared him for the offer received in 1923 to become dean of the College of Agriculture at the University of California. His decision to leave the Philippines was apparently based on several factors; the lack of any degree of permanence or of retirement benefits in his positions, increasingly demanding administrative duties and the separation from his family. Merrill had married in Manila in 1907 and four children were born of this marriage, three in the Philippines and one in Washington, D. C. The Merrills' second son died in the second month of his life and thereafter Mrs. Merrill and the children lived in the United States while Dr. Merrill remained in the Philippines. One such separation lasted five years.

In 1924 he left the Philippines to embark upon a career which was to have a remarkable influence on American botany when he accepted the position as dean of the College of Agriculture. In his autobiography Merrill describes the magnitude of the task he had undertaken. He was in charge of a faculty of three hundred and fifty individuals, but knew only one or two members personally. He "succeeded an administrator whose policies, to a considerable degree, had failed." "Reorganization and the rebuilding of the *esprit de corps* of the staff was essential. The institution was over-staffed in relation to its material equipment." The staff was divided

physically as well as intellectually. The solution of these problems was made easier in 1924 when Merrill was appointed director of the Agriculture Experiment Station, as well, and in this joint appointment his recommendations for reorganization of the faculties, research program and physical resources were possible. Merrill spent six years in these positions and his success in the reorganization can be summarized in his own words and those of his successor. In his autobiography Merrill reports:

"I had met with a certain degree of success in my administrative work . . . and had the confidence of the agricultural community, the leaders in agriculture, the staff of the College of Agriculture and of the administration and staff of the University. I had been brought to California to consummate certain definite things and these had, to a high degree, been accomplished. The perplexing problems of the institution had to a large degree been settled; policies had been established which met with the very general support of the industry and the institution. The staff had been increased; the material equipment very greatly enlarged; the annual budget augmented (from \$1,800,000 to \$2,500,000). Important new buildings had been provided for the University farm on the Berkeley campus and at Riverside."

His successor at California wrote an appreciation of Merrill which was published in the *California Countryman* and stated:

"His quickness of perception, his unfailing patience and courtesy, his great store of common sense, his promptness in taking action, his approachableness and consideration for others have won for him the admiration and high esteem of his colleagues. . . . We of the University of California record not only our deep regret at losing him but also our profound appreciation of his remarkable contribution to the success and effectiveness of the program of the College of Agriculture of the scientific activity of the University in general, of our gratitude for the friendship and sympathy which he has shown his colleagues unfailingly and of the high regard we all entertain for him as a scholar, a scientist and above all a lovable human being."

In underlining his many accomplishments Hutchison refers particularly to the fact that Merrill was instrumental in establishing one of the best sets of curricula for colleges of agriculture and that he encouraged and stimulated in a sympathetic manner the prosecution of research on fundamental problems which underlie the science of agriculture.

Merrill's several reports as director of the Agriculture and Experiment Station and as head of the College of Agriculture tell little of his scientific work. Instead they dwell on the administrative problems of morale, growth, physical resources and financial requirements so familiar in such reports. Even during these years of heavy administrative and academic responsibility, Merrill's research and publications on the flora of the Philippines, China and Asia in general did not lag. As he states in his autobiography:

"I devoted all my spare time to actual work in systematic botany and in building up the oriental reference herbarium of the University. This work was all done outside of office hours and some idea of its extent may be gained by the

statement that in these exceedingly busy six years I added in excess of 110,000 mounted specimens to the University herbarium; in this time also I prepared and published one volume of 316 pages on the flora of Borneo and numerous shorter papers on the plants of China, Borneo and the Philippines. This work in systematic botany was indeed my safety valve, for once in the herbarium, whether early in the morning before my office opened, at noon, after office hours or on Sundays or holidays, I immediately forgot my administrative problems and during these many hours devoted to botany, became merely a botanist interested in botanical matters only. At such times I never concerned myself with the numerous pressing problems of the Dean of Agriculture."

It was also during this period that herbarium work allowed the formulation in Merrill's mind of aids and improvements to the techniques used. The early developments of his innovations of cardboard herbarium boxes, literature clippings, detailed field labels and arrangement of specimens from the Orient by related geographic areas date from his years at California.

In 1926 a movement was initiated to establish a botanical garden in Los Angeles and Merrill, originally a member of the Garden Foundation, the holding corporation, also served as its first and apparently only director. The California Botanic Garden at Los Angeles, some four hundred miles away from the College of Agriculture, occupied a considerable portion of Merrill's time, for in 1927 and 1928 he was officially spending four-fifths and one-half of his time, respectively, in this position. The garden was destined to last but a few years, for the economic crash and depression, as well as Merrill's transfer to the New York Botanic Garden, spelled the end to this garden of eight hundred acres. Actually it was an active garden, however, during Merrill's supervision, for an administration building and greenhouses were built, and approximately twelve hundred species of plants were growing in various sections. Established seed and plant exchanges, foreign and domestic, were recorded and a young library was started. Most indicative of Merrill's hand, however, is the fact that in its brief existence the California Botanic Garden amassed an herbarium of 180,000 mounted specimens which, upon dissolution of the Garden, were transferred to the University of California at Los Angeles.

Merrill was approached in 1927 by officials of the Board of Managers of the New York Botanical Garden to determine whether he would be interested in becoming director of the latter organization following the retirement of Dr. N. L. Britton. In July of 1929 the matter came to definite form when the Board of Managers of the New York Botanical Garden held a special meeting to accept the resignation of Dr. Britton and Merrill reports that he learned of his appointment subject to his acceptance from an Associated Press dispatch in the San Francisco Chronicle. He also writes of personal family reasons for the change he was to undertake and comments, "If one were looking merely for power, one would not make the change, for the administration of an annual budget of \$2,500,000 in a dynamic and rapidly expanding institution was in sharp contrast to the administration of less than one-fifth of that amount in an institution that had

become almost static." The move apparently was not without regrets, for writing in 1930 from New York Merrill states:

"History repeats itself, in that frequently I have questioned my judgement in accepting my present position. As in California during my first year or two there I looked back to Manila with keen regrets that I had ever left that city, so I frequently look back to the University of California and wonder why I ever left such a dynamic, progressive, expanding institution to cast my lot with an institution that was practically static, very badly under-financed and more or less under fire for its past policies and accomplishments. To rebuild the *esprit de corps* of the staff of one institution with reasonably ample and increasing financial resources is one thing; to attempt the same thing in another institution with totally inadequate financial support and little prospect of its increase is another."

Merrill's move from the University of California to the New York Botanic Garden took place at the start of the long economic depression of 1929-1934. Perhaps his laments of 1930 as well as his actual decision to move are involved in the financial adjustments necessary in both organizations. The New York Botanic Garden was supported by funds from private endowment and in part by financial support of the city of New York. The University of California, in particular the College of Agriculture, depended on state aid. It is interesting to note that much of Merrill's success at the New York Botanic Garden depended directly on the existence of a major economic depression. In a published tribute when Merrill resigned in 1935 the Board of Managers of the New York Botanic Garden noted "in particular the promptness and foresight with which he secured for the garden the assignment of workers and appropriations of funds by various emergency relief and employment bureaus for general assistance and much-needed repairs and improvements." During the depression years the New York Botanic Garden, like many organizations of its kind, was in serious financial difficulty. Not only was the income from endowments reduced but appropriations from the city, which were the source of the labor to maintain the grounds and wages of the professional staff in the herbarium, as well as supplies such as fuel, were severely cut. In his annual report for 1933, Merrill describes the difficulties of operating the Garden on a reduced appropriation of twenty percent as compared with 1931 and the fact that capital had been expended for several years and repayments had to be made from current income.

The details of how Merrill secured assistance from public relief agencies are not known, but his annual reports while director of the New York Botanic Garden indicate the scope of financial backing (\$183,000 in 1934) which he acquired for untrained and semi-trained personnel to work in the garden and the herbarium. His reports indicate both the number of people to be supervised and the nature of the work accomplished. From the horticultural point of view it was in this period that major developments were made on the grounds of the garden. Walks were laid, roads developed, a rock garden constructed, fences built and floral displays organized and re-

organized. Appropriations from the Emergency Work Bureau and the Civil Works Administration allowed the employment of an average monthly total of eighty men in 1931, ninety in 1933 and one hundred fifty in 1934.

Women, skilled and unskilled, were available on emergency relief funds for work inside the building as mounters, artists, secretaries, librarians, clerks and technicians. In his reports Merrill speaks of seventy to ninety women employed in the herbarium and laboratories and in 1932 states the value of this assistance:

"It is impossible in this brief report to indicate in detail what this has meant to the progress of the work of the New York Botanic Garden and what it has meant to the individuals who have been given employment. It has, however, served to indicate how understaffed the New York Botanic Garden is in reference to what it is attempting to do, a fact that has long been known to the Board. The very fact that so many individuals could be employed throughout the year for productive work that has long required attention brings this situation into rather sharp relief. The employment of over three hundred individuals, with an average of over one hundred twenty per month throughout the year, has, of course, entailed distinctly heavy burdens on staff members who have had to supervise this work."

The accomplishments of this tremendous herbarium staff under Merrill's direction are indicative of the active mind of the administrator. Here was an opportunity to do herbarium work which had never existed before and which probably will never be duplicated. There was no accurate count of the total number of specimens in the herbarium of the New York Botanic Garden, so emergency labor undertook this task and a total figure was published for the first time in 1934. When the backlog of specimens in the herbarium at New York was depleted, specimens were mounted for other organizations. Merrill reports that twelve thousand specimens were mounted for the Gray Herbarium, the Arnold Arboretum and the Philadelphia Academy in 1934. Repairs were made on sheets in the New York herbarium and specimens mounted increased to 70,150 in the same year.

It was at this time, with adequate labor at the disposal of the staff, that Merrill exploited an earlier idea of placing in the herbarium proximate to the appropriate specimens, literature pertaining to those taxa. Type descriptions were copied from the literature, photostats were made and reprints cut up and the descriptions were attached either to the inside of the genus cover in the case of keys to genera and generic descriptions, or on species cover sheets for species and subspecific categories. Typists unskilled in herbarium work could prepare these descriptions and all were proofread before insertion. In the year 1934 over one hundred thousand such sheets of descriptions were added to the herbarium. In 1937 Merrill estimated that the total number of descriptions added to the herbarium at the New York Botanic Garden was "over 700,000 and it may well be greatly in excess of that number." As duplicate copies were made of all typed descriptions, the carbons were sent to other herbaria. The work continued after Merrill left New York and for many years after his arrival

at the Arnold Arboretum, he received thousands of these duplicates for insertion in the herbarium at the Arnold Arboretum.

Needless to say, the addition of seventy thousand specimens and one hundred thousand descriptions in one year crowded the standard herbarium cases and the cardboard herbarium boxes developed at California were pressed into use. Spare floor space in the herbarium was piled with these boxes as temporary housing for herbarium specimens and other boxes were piled many rows high on the top of standard cases.

In an annual report summarizing the last year Dr. Merrill was at New York, M. A. Howe reported:

"The herbarium has been growing with unabated activity. Besides the pasting in of many thousands of clippings and copies of original descriptions and cleaning and repairing specimens, 53,954 specimens have been actually added during the year. It is of note that nearly half of these additions represent Oriental specimens sent to Dr. Merrill for identification and that with the departure of Dr. Merrill, accessions from the Orient will suffer a corresponding shrinkage. Since a rate of growth similar to this has been in progress for somewhat more than five years, our herbarium cases have become full to their limit, or nearly so. We have in use at the present time more than 3,000 temporary cartons of corrugated paper in which all of our oriental material is stored. The replacement of these paper boxes alone will require about 60 standard herbarium cases and the future growth of the herbarium for the next decade may be conservatively estimated at 70 additional standard cases."

Another development possible with the surplus of labor on emergency work relief was the alphabetized series of entries for *Index Kewensis*. Merrill, years before, had seen the system of entries in *Index Kewensis* used at the Royal Botanic Garden, Kew, England, where the *Index Kewensis* is compiled and also at the herbarium in Leiden. The convenience of finding sequential entries in contrast with searching in as many as fifteen places in *Index Kewensis* was a definite advantage in herbarium work. Two teams of four women accomplished the task of cutting and pasting two copies of *Index Kewensis* in Moore loose-leaf binders. The finished books contained 2,457 pages and the labor cost was in excess of two thousand dollars.

Merrill's accomplishments at the New York Botanic Garden were great. However, he realized that the financial resources of the organization were not extensive and that the bonanza of relief labor would not last forever. He expressed this feeling in his annual report in 1932 when he stated:

"The outside plants should and must be improved preserving at the same time a definitely balanced program between scientific and horticultural work, a program however difficult to establish on the basis of our present restricted income. The New York Botanic Garden annually devotes about two-thirds of its income to maintenance and garden work, and one-third to the support of its scientific activities — just the reverse of the situation in other institutions with which we might be compared."

In 1935 Merrill received an invitation to join the staff of Harvard University as "Administrator of botanical collections." His task to ad-

minister the activities of eight and later nine separately endowed units in the field of botany. A named professorship, the Arnold Professor, was his and a recent drive had raised over one million dollars to increase the endowment. The job was indeed a challenge but this time the financial resources were greater and it appeared the task could be accomplished where a small fraction of the income need be devoted to horticulture and the large majority of funds were available for scientific work.

Merrill transferred to Harvard in the sixtieth year of his life. While he had earlier questioned in his autobiography the wisdom of changing positions at his age when he left California, he accepted the Harvard position with the understanding he would work past the normal retiring age of sixty-six until the age of seventy. Merrill actually retired at the age of seventy-two, one of only thirteen Harvard professors in the last quarter-century who were permitted to work beyond the age of seventy. Merrill therefore had ten years to accomplish the goals he outlined in his first annual report as administrator of botanical collections at Harvard. In retrospect the nature of his accomplishments speaks strongly for his abilities as an administrator and a scientist.

The position of administrator of botanical collections was created at Harvard in 1935 and Merrill was the first occupant of the post. He states "the objectives were to coordinate the work of several independently endowed units, to eliminate unnecessary duplication where possible and to integrate further the work of these units with the operations of the Department of Biology of the University." As Merrill points out:

"Professor Ames as chairman of the council of botanical collections had initiated and consummated many reforms affecting the separately endowed units. He logically abandoned the policy of isolation practiced by several of the units and adopted a new one involving closer cooperation and coordination of the work. His pioneer work established harmonious relationships between the several units in the division of biology to the advantage of biology as a whole."

Merrill's plans were to continue these interrelations with the other botanists and biologists of the university and to consolidate the physically and often intellectually separated activities. Merrill felt physical consolidation was most desirable and reports:

"It is eminently desirable that some consolidation eventually be effected but if and when this can be done depends upon a number of factors. It is a fact that Harvard University maintains three of the largest botanical libraries in America and three great herbaria. There is thus a very considerable and unavoidable duplication in purchases of both reference material, books, subscriptions to periodicals and a considerable amount of duplication of the library situation. Could some equitable plan of concentration be developed whereby the three libraries and three herbaria could be assembled in one building very material savings could be affected in maintenance charges as well as in the operation of the herbaria and the libraries. With such a change a single library would serve all three herbarium units. Such a plan would be of inestimable advantage to the three units involved not only to the elimination of duplication and even triplica-

tion but in greatly increasing the efficiency of the staff members of the now physically separated units."

Merrill's proposed solution to this was presented in his first annual report and he worked hard towards this goal throughout his years as administrator of botanical collections. His solution to problems of expansion and growth was not additions to the Administration Building of the Arnold Arboretum in Jamaica Plain and to the Gray Herbarium building in Cambridge but abandonment of these units which were to be reestablished in one central building. In 1936 he states:

"if additions be made to the two present buildings, about seven miles apart, the present unsatisfactory situation will be perpetuated. It is hoped that some practical plan of concentration can be developed whereby the herbarium and library facilities of the Gray, the Arnold and the Farlow may be concentrated in one locus."

Merrill referred to the disadvantages of the separation in all of his official reports. The strength of his feelings was emphasized in his choice of words referring to the botanical entities. "Unsatisfactory and inefficient," "can only result in stagnation and decline of productive output" "duplication or even triplication," "thoroughly unnatural, unnecessary and expensive physical separation of the library and herbarium facilities" "duplicating, triplicating and in some cases quadruplicating library purchases" are phrases often repeated in his reports.

Merrill's entreaties did not fall on deaf ears and in 1938 he apparently received an indication he should formalize his plans for a future move. With members of the Arboretum staff and through consultation with members of the organizations to be involved discussions were held and plans were drawn up. Complete blueprints of the new building were made in the summer of 1939. This building was to be located as Merrill had proposed in his reports in Cambridge between the Biological Laboratories and the Museum of Comparative Zoology and would necessitate the demolition of the Farlow Herbarium Building.

The idea, reported Merrill:

"is to bring together in one place not only the extraordinary library and herbarium facilities of the Gray, the Arnold and the Farlow but also as to the library the enormous collections of the Museum of Comparative Zoology thus forming a single comprehensive biological library. The logical place for this development is contiguous to the University Museum and the Biological Laboratory in Cambridge. This one great library would then serve all the biological needs of the University and would form a great collection of reference literature vastly superior in size and content to any similar collection of published biological data in America. . . . The ideal is one building sufficiently large to house adequately the existing reference collections of the botanical libraries and to allow for reasonable expansion. Such a consolidation would immensely increase the efficiency of all the units involved, reduce maintenance expenses, expedite the work of staff members and release for exchange or sale a vast amount of duplicate material that would no longer be needed here."

The building Merrill and his committee planned was never named although possible honors were discussed. The building was to house the collection of glass flowers on the first floor. One wing of the building was to house the combined libraries of the Arnold, Gray Herbarium, Farlow Library, Museum of Comparative Zoology and the Ames Orchid Herbarium and Library on five full floors and three additional half floors and these would occupy over 24,750 square feet of floor space. The major portions of three floors would be utilized as herbarium space. Only two offices were planned in the building for the staff was to occupy tables in the herbarium following the systems then in use at both the Gray and the Arnold. The facade of this very modern building would bear the names of Arnold, Gray and Farlow and the building could be built and equipped for less than one million dollars. In the fall of 1939 the international situation worsened with the outbreak of war in Europe and the concomitant restrictions imposed in the United States. It was soon apparent that construction of a major building at that time was impossible and unpatriotic. Thus the well drawn plans for consolidation of botanical resources at Harvard were laid aside for the duration of the war.

Merrill began his career at Harvard with an office in the Gray Herbarium building in Cambridge. His personal concern however was the administration of the funds of the Arnold Arboretum and only the supervision and coordination of activities of the eight other privately endowed institutions. After the first year he transferred his headquarters to Jamaica Plain when the University acquired a residence for the director of the Arnold Arboretum which appended the grounds. Merrill lived in this house on 960 Centre Street until the time of his death. This residence became a mecca for visiting botanists who at the same time could be within one hundred yards of the Administration Building with its fine herbarium and the famous collection of trees and shrubs on the grounds.

To assume responsibility for horticulture and the care of the grounds Dr. Merrill added for the first time the position of "Horticulturist" to the staff of the Arboretum, and the horticulturist, assisted by the propagator and superintendent of buildings and grounds, assumed the responsibility for the living collections allowing Merrill to devote his undivided attention to the herbarium and library and his personal research on Asia. The interest of the Arboretum in the flora of Asia dated from the period of Sargent and reflected especially the field activities of E. H. Wilson. Wilson was a botanical collector with an eye of appreciation for the potential ornamental trees and shrubs of the area. Wilson collected herbarium specimens for vouchers of the seeds and for more detailed study of the plants considered useful as ornamentals. Wilson had died before Merrill's appointment at Harvard and in his first year, with sufficient funds for such activities Merrill began a program of field work, supporting native botanists in their home area with small grants of money to enable them to collect specimens and to send seeds of the most promising ornamental plants seen. The initial grants went to Chinese botanists but eventually support was extended to botanists in Japan, Korea, the Philippines and in fact most areas of

Asia where botanists existed. During two years of Merrill's administration as many as fourteen botanists and institutions were conducting field work subsidized by the Arnold Arboretum. The number dropped during the war years and increased immediately afterward. It wasn't long before the specimens began to arrive at the Arnold Arboretum. Some were identified, but the majority were not. In this situation Merrill was at his best. Few botanists could match Dr. Merrill in "spot" identification of material from Asia and it was a rare plant which was not immediately analyzed with a selective eye and placed in the proper genus and family or if too common promptly discarded. Those selected for further study went promptly to the mounters and the number of specimens prepared for insertion in the herbarium increased. Space to house these specimens soon became critical for the new additions soon outgrew the space available in the standard herbarium cases. Once again Merrill resorted to the cardboard herbarium cases developed at California and used again at New York to meet the same situation of rapid expansion. Display rooms for museum collections open to the public soon were pre-empted for herbarium storage and every nook and cranny began to hold cardboard herbarium boxes of specimens.

In the herbarium proper Merrill introduced the ideas he had developed earlier at New York and California. Ten phytogeographic areas were designated with a different colored folder for each area. The organization of this system in a herbarium of half a million specimens was a major undertaking for the botanists on the staff.

The Arboretum possessed copies of *Index Kewensis* and here again Merrill carried out the alphabetization of entries which had been done at New York with emergency labor funds and relief workers. The principal difference was that at the Arboretum the work was done by the professional botanists on the staff.

The system of clippings begun at New York was also continued by Merrill on his arrival at Harvard. Perhaps foresightedly Merrill had had carbon copies prepared and while some of these were sent out gratis from New York Merrill formalized the agreement while at Harvard and helped support a continuation of this work at New York with the originals coming to the Arnold Arboretum. While it is true these clippings save an enormous amount of work and decrease the necessity of going to the library for original descriptions their method of insertion began to add to the bulk in an already overcrowded herbarium. The species covers with the attached descriptions were often thick. In many cases both genus and species covers were prepared for descriptions where there were no specimens. In other cases several sheets of paper were involved for species reduced to synonymy and so descriptions were filed in two or more places in the herbarium. Various measures were taken to relieve temporarily the congestion present in both the herbarium and the library. More American material was transferred on semi-permanent loan to the Gray Herbarium, thereby increasing their problems of handling and storing the specimens. The orchids were transferred to the Ames Herbarium in the botanical museum. A large col-

lection of books dealing with forestry were transferred to the Harvard Forest in Petersham, Massachusetts. Some of the older pre-linnean works were transferred for more satisfactory protection to the rare book library of Harvard. Within the herbarium proper there was absolutely no room for insertion in sequence of newly mounted materials and so a second family sequence was started on the tops of the steel cases by storing mounted sheets in cardboard cartons. Tables and alcoves formerly used by staff and visitors were confiscated for specimens. Display materials were stored in the barn and the collection of wood specimens and slides were moved to space in the biological laboratories in Cambridge.

Each innovation while improving the usefulness of the herbarium proved expensive, in the cost of professional staff time for the work, in the materials and in compounding the already crowded situation in the herbarium.

In the meantime at Harvard Merrill's research on the floras of Asia increased. Horticultural work caring for the grounds and meeting the public was adequately handled by the new horticulturist. Identifications of horticultural plants were the interest of Alfred Rehder. Funds for the first time in Merrill's career were adequate for taxonomic research and purchase of specimens or support of foreign collectors and as the new collections were studied his personal production of scientific articles jumped.

Using the extensive library resources of the Arboretum he published alone and with co-authors a "Polynesian Botanical Bibliography" of 194 pages and a "Bibliography of Eastern Asiatic Botany" of 719 pages. He maintained and increased his bibliographies of the Philippines and for other island areas which unfortunately were never published.

His interest in validating botanical names led him to study critically the descriptions of older and often ignored botanical publications. The work of Otto Kuntze on plants from Indo-china, Palisot de Beauvois, Houttuyn, Muhlenberg and Rafinesque on plants from America revealed many combinations unrecorded in *Index Kewensis* which affected the nomenclature of plants from America as well as Asia. Feeling strongly that these works should be consulted more frequently but recognizing that the volumes were rare and unavailable Merrill instituted a technique to reproduce many of these rare volumes by lithoprint. The copies in the library of the Arnold Arboretum were used in the process but the work was financed largely through private funds supplied by Dr. Merrill.

The specimens in the Linnaean herbarium were also considered by Dr. Merrill to be too inaccessible to most American botanists and he encouraged the recording of these specimens and their available data on microfilm. This was accomplished during the war years through a grant from the Carnegie Foundation. When the Arnold Arboretum received these microfilms Dr. Merrill had 5×7 glossy prints made of each and mounted on stiff cards approximately twice that size. The complete data from Savage's catalogue was printed with the photograph and together these data form a valuable research tool.

His taxonomic interest turned to New Guinea with the prospect of an expedition visiting that area and in 1936-1937 the Arnold Arboretum sup-

ported financially the botanical efforts of the second Archbold Expedition to that immense island. All of the specimens collected by the botanists were sent to the Arboretum where the collections were studied, labels prepared and the duplicates distributed. The same arrangements were made with successive expeditions to the area and in these plant collections came close to a thousand plants new to science. As co-author with Dr. Lily Perry of the Arboretum staff there began in the Journal of the Arnold Arboretum the series, "Plantae Papuanae Archboldianae" of which Number 18 was published in 1949.

Merrill's familiarity with the Pacific Islands and the vegetation of that area proved of great value during the war years. He was frequently called to Washington for consultation and the full record of his service will probably never be revealed. In 1945 he was the recipient of the Appreciation Certificate for his services as Consultant to the Secretary of War. With the assistance of Mr. Gordon Dillon on the art work, Dr. Merrill compiled a handbook of the "Emergency food plants and Poisonous plants of the islands of the Pacific" which was published by the government as a War Department technical publication. The illustrations and the text of this booklet were reproduced in many of the survival manuals issued by the branches of the military service. In this publication Dr. Merrill's personal experience as well as the excellent library and herbarium resources of the Arnold Arboretum were evident. This book remains extremely useful to the botanist for the compilation of local and dialect names for the common plants of the Pacific Islands. As part of the education program for our troops in the Pacific theatre several books on wild life and natural history were published. Dr. Merrill contributed the material on plants in "The Pacific World" which was edited by Fairfield Osburn and later wrote the more comprehensive "Plant Life of the Pacific World" which was published with hard covers by the Macmillan Company and in a pocket and paper cover edition by the Infantry Journal as one of the Fighting Forces editions. In these booklets Dr. Merrill described the technique for collecting plants as scientific records of the vegetation of the area. In response to many inquiries Dr. Merrill was always encouraging, and correspondents wherever they might be stationed were invited to send plant specimens in for determination. With the assistance of other members of the Arboretum staff these plants were identified, some interesting facts about the collection or the taxon related and the determination promptly returned. Many commanding officers and postal censors considered such activities as violation of security regulations and many shipments of specimens were confiscated and sent to government agencies or destroyed.

When the war in Europe ended and it appeared only a matter of time before hostilities in the Pacific would be over Dr. Merrill renewed his requests for a consideration of the problems of the herbaria and libraries he supervised. The continued increase in the Harvard University herbaria during the war years had completely filled all available space and the libraries were overflowing the shelf space available. Dr. Merrill suggested that the plans for a consolidation and the construction of a new building

which had been drawn up and tentatively approved in 1938 and 1939 should be reviewed for quick action once the war was over and building restrictions lifted. In 1944 Dr. Merrill was sixty-eight years old, three years beyond the normal age at which professors are normally freed of administrative duties and two years beyond the normal retirement age. In view of Dr. Merrill's expected retirement at age seventy, the Provost asked Professor I. W. Bailey, professor of wood anatomy on the staff of the Arnold Arboretum and senior botanist in length of service to Harvard, to review the previously drawn plans and submit a confidential report. This report entitled "Botany and its applications at Harvard" was written with the consultation and advice of the botanists in the many botanical institutions at Harvard and was approved by them all. Dr. Merrill moved for the acceptance of this report at the faculty meeting where it was submitted and Dr. Fernald, then director of the Gray Herbarium, seconded the motion. The report was approved on March 1, 1946, by the President and Fellows in their joint role as Administrators of Harvard College and Trustees of the Arnold Arboretum. The program proposed repeated Merrill's call for the erection of a single building to house the herbarium and library collections of the several botanical institutions at Harvard, as well as some administrative changes. The new building was to be in the location proposed earlier by Dr. Merrill but would not be as all-inclusive as he had originally visualized, for it did not seem practical to house the libraries of the Biological Laboratories and the Museum of Comparative Zoology in one unit. However the combination of libraries and herbaria proposed would reduce the duplication of purchases and expenditures, provide new and larger quarters and allow room for expansion and bring staff members of similar interests in closer association for mutual benefit.

Construction of the new herbarium building was delayed until wartime restrictions on building were lifted and in the meantime further discussion of the proposed administrative reorganization took place. The new building was finally erected in 1953 and occupied in 1954, eighteen years after it was first proposed by Dr. Merrill.

When Dr. Merrill was no longer involved in the affairs of administration of the Arnold Arboretum he directed his attention full time to his research. The contacts which he once had had with botanists in Asia were reestablished and supported by grants from the Arboretum and these men again began to send collections for Dr. Merrill's attention. Special mention should be made of the efforts of Dr. Merrill to supply his botanical friends with the necessities as well as a few of the luxuries of life in their post-war existence under rationing restrictions. To Asia and to Europe Dr. Merrill directed packages he himself prepared. His contributions in the form of CARE packages will never be forgotten as an indication of his extreme concern and generosity for his friends.

One botanical expedition in China collecting for the Arnold Arboretum located fruiting trees of *Metasequoia* which Merrill described as another "living fossil." This exciting discovery opened a new vista and Dr. Merrill became a modern "Johnny Appleseed," for he acquired several bushels of

these seeds which he distributed widely for trial. At one European horticultural meeting Merrill made a lasting impression by appearing on the speakers' platform his pockets bulging with what proved to be the seeds of this most unusual plant. His interest in the distribution and the success of this introduction lasted until his death.

Dr. Merrill had been on the selection board of the Guggenheim Foundation for many years and contributed valuable service in the screening of the many applications. In 1951 he in turn was the recipient of a grant, the first of several grants from the Foundation which enabled him to spend six months in Europe where he visited many of the major herbaria. He examined many of the types of Asiatic plants, making critical notes and carbon paper tracings. At the British Museum he worked over and identified many old collections and selected for the Arboretum a number of available duplicates of the Carr collection from New Guinea. At Brussels he critically studied the Roxburgh specimens in the Martius herbarium and prepared a list of the plants and their identifications. Carbon copies of this list were sent to the several institutions maintaining an interest in such Asiatic collections, but unfortunately the data have not been published. It was unfortunate that Dr. Merrill suffered another severe heart attack while on this European trip and from that time on was advised to limit his activities and restrict his travel. It meant that he had to give up his winter trips to Cuba, Honduras and Panama and he found the New England winters more difficult to endure. His thoughts remained in the tropics, however, and he reacted violently to some well-publicized theories of transpacific migration of plant materials involving raft travel and human agencies. The problems of distribution of American crop and weed plants in the Pacific and Asiatic plants in the western hemisphere had long been of interest and concern to him. As early as 1904 he had published on "The American element in the Philippine Flora" and at the end of the war he investigated the species introduced in the region of Manila by military activities. His last few years were spent in examining the manuscript records of the early expeditions to the Pacific islands. His observations and opinions were expressed in typical Merrillian fashion in his final publication, "The botany of Cook's voyages and its unexpected significance in relation to anthropology, biogeography and history," published by *Chronica Botanica* in 1954.

Merrill is survived by his widow, Augusta Sperry Merrill and one son, Dudley. His ashes are to be interred in a family plot in East Upton, Massachusetts.

In retrospect only one word can satisfactorily describe Elmer Drew Merrill and his contributions to the knowledge of botany. He was a builder. His handiwork is evident in many parts of the world. In herbaria alone Merrill must receive credit for amassing outstanding collections. The two thousand specimens collected as a student at the University of Maine were given to the New England Botanical Club. In the Philippines he began the herbarium of the Bureau of Science which in 1922, two years before his departure, contained two hundred seventy-five thousand mounted

sheets. At California, herbarium accessions in the two years before Merrill's arrival averaged 8,250 sheets but swelled from 27,000 to 37,000 sheets a year during and immediately after his administration. His own estimate of the increase in the herbarium at the University of California during his stay there was 110,000 sheets. During the short period of his directorship of the California Botanic Garden an herbarium was started and built up to over 180,000 sheets. From 1930 to 1935 Dr. Merrill, as director of the New York Botanical Garden, increased the herbarium under his supervision by over 280,000 mounted specimens and to this must be added the insertion of over 700,000 sheets of descriptions of plants. At Harvard, too, the herbaria felt his influence, for the herbarium of the Arnold Arboretum, founded in 1872, increased over fifty percent in size during the term of his directorship, from 409,000 to 631,000, while at the same time, in excess of 130,000 sheets were transferred to the Gray Herbarium, the Farlow and Ames Herbaria. Thus, one man has accounted for the amassing of botanical resources totalling over one million sheets of herbarium specimens and untold numbers of duplicates distributed for the benefit of the botanists to follow him.

Our path has been made clearer by his keen mind and his extensive record of publications. Nearly five hundred titles are credited to his pen, for he published one hundred forty-five significant papers and books on the flora of the Philippines, fifty-four on China, thirty on New Guinea and more than a dozen each on islands such as Sumatra, Borneo and Java. His desire for simplification in the citation of technical journals led to the adoption of one-word titles for periodicals such as *Brittonia* and *Sargentia*, which he helped create, or *Hildgaardia* and *Arnoldia*, which replaced more cumbersome names. While he had few students to carry on his work, his influence of position and personality carried respect and won for him many times the honor of having his name associated with a living plant. The genera and species named by him number more than a thousand and those named for him are more than a dozen. *Magnolia* "Merrill" carries his name in the north, as does the Merrill Palm (*Adonidia merrilli*) in the tropics.

It can be said with respect and appreciation that he made his immortality through the plants that he loved.

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